REMARKS

I. Overview

Claims 9-15 are pending in the present application. Claims 1-8 were previously canceled. Claims 9 and 12 have been amended and new claim 15 is added herein. Applicant respectfully requests reconsideration of the claims in view of the following remarks.

The issue raised by the Examiner in the Office Action dated May 19, 2009 ("Office Action") is:

- Claims 9-15 are rejected under 35 U.S.C. § 103(a) as assertedly being unpatentable over U.S. Patent No. 5,298,919 to Chang (hereinafter "Chang") in view of U.S. Patent No. 5,589,893 to Gaughan, *et al.* (hereinafter "Gaughan") and U.S. Patent No. 4,493,219 to Sharp, *et al.* (hereinafter "Sharp") and further in view of U.S. Patent No. 5,724,106 to Autry, *et al.* (hereinafter "Autry").

Applicant respectfully traverses the outstanding claim rejections and requests reconsideration and withdrawal in light of the amendments and remarks presented herein.

II. Claim Rejection – 35 U.S.C. § 103

Claims 9-15 stand rejected under 35 U.S.C. § 103(a) as assertedly being unpatentable over Chang in view of Gaughan and Sharp and further in view of Autry. (Office Action at 2).

On page 5 of the Office Action, there is a reference to "Suzuki," which was cited in a prior action (U.S. Patent No. 5,491,497). Applicant understands this reference to Suzuki to be included an error since neither "Suzuki" nor U.S. Patent No. 5,491,497 were listed in the rejection in paragraph 4 on page 2. If the Suzuki reference was intended to be included in the rejection of the pending claims, Applicant requests such clarification in a new non-final Office Action.

A. *Expert Declarations*

Applicant has submitted herewith the declarations of two experts: Blake Hannaford, Ph.D ("Hannaford Decl.") and Brent Gillespie, Ph.D. ("Gillespie Decl."). The experts' declarations identify differences between the claimed invention and the cited references. These declarations are cited below in support of Applicant's response to the current rejections.

B. ***Single Input Member***

Claims 9 and 12 require:

> a single input member capable of being manipulated in six degrees of freedom by a human hand to control movement of the three-dimensional imagery in six degrees of freedom.

The Office Action cites the Chang reference as teaching a single input member capable of being manipulated in five degrees of freedom. (Office Action at 2). The Chang reference is discussed at length in the specification of the present application, which identifies the differences between embodiments of the present invention and the Chang disclosure. (Specification at p. 6, ln. 15 - p. 9, ln. 6). Specifically, the specification of the present application notes that the Chang reference does not teach "a single input member" as required in the pending claims. (*Id.* at p. 9, lns. 2-6).

Applicant's experts, Hannaford and Gillespie, agree that Chang does not teach a single input member and explain in their respective declarations the differences between a "single input member" as required by the claims and the Chang reference. (Hannaford Decl. ¶¶ 14-21; Gillespie Decl. 14-20, 24).

Chang discloses a computer input device, such as mouse 10. Chang's mouse 10 requires the user to operate three "locating members 16, 18, 20" to input translational and rotational information for six coordinates or degrees of freedom. (Chang col. 4, lns. 18-37). In the embodiment described in Chang, the first locating member is roller ball 22, such as is found on the bottom of a typical mouse, providing inputs for two translational coordinates on the X- and Y-axes. (Chang col. 4, lns. 38-41). The second locating member is thumbwheel 26 providing input for a third translational coordinate on the Z-axis. (Chang col. 4, lns. 41-44). The third locating member is trackball 32 providing an input for three rotational coordinates about the X-, Y-, and Z-axes. (Chang col. 4, lns. 44-46). These three inputs (roller ball 22, thumbwheel 26, and trackball 32) are all required in order to provide inputs for six degrees of freedom using the Chang device. Accordingly, Chang teaches a multiple-input device that controls six degrees of freedom.

The Office Action states that trackball 32 is "single input member" that is

> capable of being manipulated in 5 degrees of freedom by a human hand (ball 32 is capable of being manipulated in all directions of the table upon which the mouse rests (two degrees) and in each rotational direction by virtue of being a rotatable sphere (three degrees)).

(Office Action at 2). Presumably, the Examiner means that trackball 32 can move in the X- and Y- axis translational directions with mouse 10 across a table. However, trackball 32 is unable to provide any input in the X- and Y- axis translational directions when it is "being manipulated in all directions of the table upon which the mouse rests (two degrees)." It is not enough for trackball 32 to be moved in five or six degrees of freedom. In order to be a "single input member" as required in claims 9 and 12, trackball 32 must provide inputs for each degree of freedom.

Applicant has amended claims 9 and 12 to require that the single input member "control movement of the three-dimensional imagery in six degrees of freedom." Chang's trackball 32 is unable to control imagery in more than three degrees of freedom. Trackball 32 is limited to providing inputs for the three rotational coordinates or degrees of freedom about the X-, Y-, and Z-axes. (Chang col. 4, lns. 44-46). There is no teaching or suggestion in Chang that trackball 32 can be modified to provide translational inputs along the X-, Y-, or Z-axes as would be required for five or six degrees of freedom. (*See also*, Hannaford Decl. ¶ 21; Gillespie Decl. ¶¶ 18-19).

The claimed controller can be manipulated in six degree of freedom relative to a reference member. The controller can be moved linearly along and/or rotated about three mutually perpendicular axes in six degree of freedom relative to the reference member. (Specification at p. 16, lns. 1-10). The input member may be a handle or trackball that is operated relative to a reference member such as a base, shaft or housing. (Specification at p. 11, ln. 13 - p. 12, ln. 1; p. 17, lns. 3-8). For example, housing 10 may be a reference member for input member trackball 12. (Specification at p. 27, lns. 9-15) and shaft 204 may be a reference member for input member joystick handle 202. (Specification at p. 44, lns. 4-8). In another example, in the Nintendo Wii system, the Wii sensor bar is a reference member for the Wii Remote input member. These input members are operated in six degree of freedom relative to their respective reference members. A secondary input member may move independently of the first input member. (Specification at p. 39, ln. 20 - p. 40, ln. 4).

The Office Action states that "Chang does not expressly disclose a sixth degree of freedom." (Office Action at 3). Applicant disagrees. Chang explicitly states that mouse 10 can be used for six degrees of freedom. (Chang col. 4, lns. 36-37). A significant difference between Chang and the pending claims is that Chang is not a "single input member." Instead, Chang is a multiple-input member that requires three separate and independent inputs (22, 26, 32) to control six degrees of freedom. (*See also*, Hannaford Decl. ¶ 22).

In order to add the "missing" sixth degree of freedom to Chang's trackball 32, the Examiner points to trackball 42 in Figure 6 of the Gaughan reference. (Office Action at 3). Gaughan's trackball 42 provides rotational inputs can be converted by code wheels 72, 86 to X- and Y- displacement information. (Gaughan Figs. 6, 7; col. 4, lns. 14-28). Trackball 42 may be used to position a cursor 56 on a viewing screen. (Gaughan Fig. 6; col. 4, lns. 47-48). Gaughan's trackball 42 may be depressed (in a Z direction) to cause activation of switch 44. (Gaughan col. 4, lns. 28-30). When trackball 42 is positioned over a desired function on the viewing screen, depression of trackball 42 activates switch 44 resulting in execution of a selected control function. (Gaughan col. 4, lns. 57-63). The use of trackball 42 to select a function is not an input for a sixth degree of freedom. (*See also*, Hannaford ¶¶ 25-27; Gillespie Decl. ¶¶ 21-25).

The Gaughan trackball 42 is intended only to move a cursor in the X-Y direction on a viewing screen. Accordingly, trackball 42 only controls one X-Y coordinate system. Gaughan does not disclose controlling any axes other than the X-Y axes of the viewing screen. There is no reason to control a different degree of freedom (e.g. a Z-axis) because the Gaughan cursor only needs to move in the X-Y plane.

Gaughan does not disclose an input for movement along a sixth degree of freedom or Z-axis. The vertical movement of trackball 42 does not provide a proper axial input - i.e. it does not provide a bi-directional input - to control a Z-axis. Switch 44 is either open or closed and is used to send an activation signal to select a function. (Gaughan col. 4, lns. 60-62). Accordingly, when trackball 42 is depressed, a signal is generated. That signal cannot be used to control movement on a Z- axis or a sixth degree of freedom. Therefore, the combination of Chang's trackball 32 and Gaughan's trackball 42 does not create a "single input member" that is "capable of being manipulated in six degrees of freedom by a human hand" and that is further used "to

control movement of the three-dimensional imagery in six degrees of freedom." If Chang's trackball 32 was capable of moving in the Z-direction like Gaughan trackball 42, it would not be a six degree of freedom "single input member" as required in the pending claims. Instead, it would be three degree of freedom input member that was also capable of providing a function selection input.

Chang teaches that roller ball 22 and thumbwheel 26 provide translational inputs along the X-, Y-, or Z-axes. There is no teaching or suggestion in Chang that trackball 32 can be modified to provide these X-, Y-, or Z-axis translational inputs along as would be required for trackball 32 to provide five (or even six) degrees of freedom. Furthermore, there would be motivation for one of ordinary skill in the art to modify Chang's trackball 32 to provide translational inputs along the X-, Y-, or Z-axes because those inputs already exist in the Chang mouse 10.

C. *Secondary Input Member*

Claims 9 and 12 require:

> a secondary input member capable of being controlled by the human hand to effect bidirectional movement of the three-dimensional imagery on at least one axis independent of the control of three-dimensional imagery by the single input member.

The Office Action identifies Chang's roller ball 22 as the secondary input member that is "capable of being manipulated by the human hand to effect bidirectional movement on at least one axis." (Office Action at 3).

Applicant has amended claims 9 and 12 to require the "secondary input member" to effect bidirectional movement "of the three-dimensional imagery" on at least one axis "independent of the control of three-dimensional imagery by the single input member." Chang's roller ball 22 does not control imagery "independent" of the single input member. Instead, Chang's roller ball 22 is an integral part of mouse 10 that is required to control translational movement along the X- and Y-axes (i.e. two of the six degrees of freedom controlled by mouse 10).

As noted above, Chang's mouse 10 is a multiple-input member that requires three separate and independent inputs (22, 26, 32) to control six degrees of freedom. By removing

roller ball 22 (or at least significantly modifying its use and purpose), the Examiner is "crippling" mouse 10 so that is becomes a four degree of freedom device. One of ordinary skill in the art would not be motivated to degrade the functionality of Chang's mouse 10 in this way. (*See also*, Hannaford Decl. ¶ 23).

D. *Proposed combination of references*

The Chang reference is directed to "an input device for providing multi-dimensional spatial input data to a computer." (Abstract). The Gaughan reference is directed to a "television remote control system including an on-screen cursor." (Abstract). The Autry reference is directed to "remote control units for electronic devices" such as a home entertainment system. (Col. 1, lns. 10-12).

The Office Action suggests that Chang, Gaughan and Autry are analogous art because they are from the same field of endeavor namely multi-dimensional input devices. (Office Action at 4, 5). Applicant traverses the proposal that these devices are from the same field. In particular, Chang is directed to a multi-dimensional device (i.e. a multiple input, six degree of freedom device), but Gaughan and Autry are directed only to cursor placement on a flat television screen. Gaughan and Autry are not related to multi-dimensional input devices, such as the claimed device. One of ordinary skill in the art would not be motivated to combine the Chang system with the TV remote controls of the Gaughan or Autry patents. (*See also*, Hannaford ¶¶ 28-32).

III. Conclusion

Claims 10, 11, and 13-15 depend from independent claims 9 and 12, respectively, and add further limitations. It is respectfully submitted that these dependent claims are allowable by reason of depending from an allowable claim as well as for adding new limitations.

Applicant has made a diligent effort to place the claims in condition for allowance. However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Applicant's attorney at 214-722-8983 so that such issues may be resolved as expeditiously as possible.

Respectfully submitted,

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Date

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